

## TOP TEN ACCIDENTS AND HOW TO PREVENT THEM

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**SOME OF THE MOST DANGEROUS JOBS IN THE UNITED STATES ARE FOUND IN THE WASTE SERVICES INDUSTRY. STATISTICAL INFORMATION FROM THE BUREAU OF LABOR STATISTICS, ANECDOTAL EVIDENCE AND HISTORIC OSHA CITATIONS WERE USED TO IDENTIFY THE MOST COMMON ACCIDENTS THAT OCCUR IN THIS INDUSTRY. THE NATURE OF WASTE INDUSTRY JOBS EXPOSES WORKERS TO A VARIETY OF SITUATIONS IN WHICH THEY MUST HANDLE HEAVY LOADS, WORK AROUND DANGEROUS EQUIPMENT IN CLOSE PROXIMITY TO TRAFFIC AND NOISE, OR BE SUBJECTED TO OTHER DISTRACTIONS. THESE JOBS OFTEN REQUIRE HEAVY LIFTING WHICH CAN RESULT IN INJURY WHERE ERGONOMIC FACTORS ARE LESS THAN OPTIMAL. POOR WORKING CONDITIONS OR FAILURE TO FOLLOW CORRECT PROCEDURES CAN CAUSE WORKERS TO BE INJURED BY BEING STRUCK BY OR CAUGHT IN EQUIPMENT AND VEHICLES COMMONLY USED IN TRANSFER STATIONS AND RECYCLING FACILITIES. UNFORTUNATELY, THESE INJURIES ARE SOMETIMES FATAL. IN ORDER TO PREVENT SUCH INJURIES AND FATALITIES, MANAGEMENT IN WASTE SERVICE INDUSTRIES NEED TO BE PROACTIVE AND VIGILANT TO INSURE COMPLETE IMPLEMENTATION OF STRONG SITE SPECIFIC SAFETY PROGRAMS. THE MOST EFFECTIVE PROGRAMS REQUIRE FULL MANAGEMENT SUPPORT, ACTIVE EMPLOYEE PARTICIPATION, AND EFFECTIVE TRAINING.**

### Sources of Information

Historically garbage collectors and other related waste service jobs have ranked high for on-the-job fatalities and other serious but non-fatal injuries. According to the Bureau of Labor Statistics (BLS), 2001, garbage collector was ranked as the sixth highest job resulting in fatality. Garbage collectors are ten times more likely to be killed on the job than the average worker. (Figure 1) The nature of waste service work requires at-risk behaviors such as working on irregular, sloped or slippery surfaces; working in close proximity to moving vehicles and other large dangerous equipment; working in a noisy environment and heavy lifting.

The Bureau of Labor Statistics is the principle fact finding agency for the Federal Government in the field of labor economics and statistics.<sup>1</sup> Safety professionals find the BLS to be a reliable, accurate and consistent source of information from which to analyze safety trends.

It would be difficult to make a definitive list of the top

ten accidents that occur in the waste service industry based solely on the BLS statistics. Information on injuries is provided in a broad category rather than on specific types of accidents. Rather than provide a specific list of ten types of accidents, this paper uses the same method as the BLS statistics to discuss categories of injuries. In addition, the agency's statistics are collected based on Standard Industrial Classification (SIC) codes. These classifications represent broad categories that encompass a number of industries. Jobs specific to the waste handling industry represent only a small percentage of jobs within each of the categories. For example, garbage collection is grouped with transportation - local trucking without storage. Workers in recycling facilities are grouped with auto dismantlers and waste oil handlers. Obtaining accurate statistics to determine the top ten accidents specific to the waste industry, rather than to all of the jobs contained within the three BLS categories, would require research that is outside the scope of this article.

Information for this paper was primarily drawn from the BLS data on broader job classifications. Though more specific statistical data may be collected by Industry

1. Mission statement from the Bureau of Labor Statistics website; <http://stats.bls.gov/bls/infhome.htm>.

groups, this data was not readily available and therefore was not incorporated into this paper. This paper also relied upon anecdotal evidence specific to the waste management industry and the author's knowledge to identify hazards more specific to the industry and to discuss options for preventing those types of accidents.

## Bureau of Labor Statistics Classifications

The following definitions come from the Standard Industrial Classification Manual, 1987.

### ***Industry Group 421: Trucking And Courier Services, Except Air***

#### ***Local Trucking Without Storage – Category 4212***

*Establishments primarily engaged in furnishing trucking or transfer services without storage for freight generally weighing more than 100 pounds, in a single municipality, contiguous municipalities, or a municipality and its suburban areas. Establishments primarily engaged in collecting and disposing of refuse by processing or destruction of materials are classified in Industry 4953*

The first category, Local Trucking Without Storage, Category 4212, specifically lists garbage collection as one of the occupations contained within this SIC classification. It is from this classification that BLS listed garbage collection amongst the top ten hazardous jobs for 2001. Due to the time required for data collection and statistical analysis, the 2001 data is the most recent information available. Historic data show the trends in types of injuries has not changed significantly in recent years.

### ***Industry Group 495: Sanitary Services - 4953 Refuse Systems***

*Establishments primarily engaged in the collection and disposal of refuse by processing or destruction or in the operation of incinerators, waste treatment plants, landfills, or other sites for disposal of such materials. Establishments primarily engaged in collecting and transporting refuse without such disposal are classified in Transportation, Industry 4212.*

Landfill and transfer station workers are included in the classification Sanitary Services, 4953 Refuse Systems.

### ***Industry Group 509: Miscellaneous Durable Goods -***

#### ***5093 Scrap and Waste Materials***

*Establishments primarily engaged in assembling, breaking up, sorting, and wholesale distribution of scrap and waste materials.*

Recycling facilities are included in classification 5093, Scrap and Waste Materials.

Specific data for injuries within these classifications is provided in Tables 1, 2 and 3. Other than the information from Figure 1, statistics are not provided for fatal accidents.

## OSHA Citations

Another way to determine trends in safety in an industry is to look at the regulations most frequently cited during OSHA inspections. The following tables provide lists of the top ten Federal OSHA citations for each of the SIC codes covering the waste services industry. These citations were issued for the specified SICs during the period October 2001 through September 2002. Information from these tables will be used in subsequent discussions of accident prevention.

### SIC code 4212

Citation	Regulation Name
1910.1200	Hazard Communication
1910.0305	Electrical, Wiring Methods, Components & Equipment
1910.0134	Respiratory Protection
1910.0157	Portable Fire Extinguishers
1910.0178	Powered Industrial Trucks
1910.0132	Personal Protective Equipment, General Requirements
1910.0120	Hazardous Waste Operations & Emergency Response
1910.0303	Electrical Systems Design, General Requirements
1910.0023	Guarding Floor & Wall Openings & Holes
1910.0147	The Control of Hazardous Energy, Lockout/Tagout

### SIC code 4953

Citation	Regulation Name
1910.0134	Respiratory Protection
1910.0147	The Control of Hazardous Energy, Lockout/Tagout
1910.1200	Hazard Communication
1910.0120	Hazardous Waste Operations & Emergency Response
1910.1030	Bloodborne Pathogens
1910.0023	Guarding Floor & Wall Openings & Holes
1910.0303	Electrical Systems Design, General Requirements
1910.0305	Electrical, Wiring Methods, Components & Equipment
1910.0146	Permit-Required Confined Spaces
1910.0178	Powered Industrial Trucks

### SIC code 5093

Citation	Regulation Name
1910.1025	Lead
1910.0147	The Control of Hazardous Energy, Lockout/Tagout
1910.0134	Respiratory Protection
1910.1200	Hazard Communication
1910.0178	Powered Industrial Trucks
1910.0212	Machines, General Requirements
5A0001	General Duty Clause (Section of OSHA Act)
1910.0253	Oxygen-Fuel Gas Welding & Cutting
1910.0157	Portable Fire Extinguishers
1910.0132	Personal Protective Equipment, General Requirements

### Most Frequently Occurring Types of Waste Service Industry Accidents/Hazards

Tables 1, 2 and 3 provide data for non-fatal accidents within the selected SIC codes. This level of statistical detail is not available for accidents resulting in a fatality. Based on OSHA citations and anecdotal evidence, fatal injuries are most frequently a result of vehicle accidents, for example, falling from a moving garbage truck, or being run over or hit by a garbage truck or loader. Employees are also killed in accidents where equipment was not properly locked or tagged out prior to maintenance, or when machine guards have been removed. These accidents involve electrocution, crushing injuries and suffocation from being entangled in machinery. The OSHA regulations listed in the previous section all contained citations for violations in Lockout/Tagout.

Sprains and strains are by far the most common non-fatal injury, not only in the waste services industry, but also throughout the workforce in all industries, making up almost forty five percent of all injuries. Fractures are the second most common in the waste industry, making up nearly ten percent of all injuries. Cuts and bruises make up approximately eight percent of all injuries. These statistics are an average among the three SIC codes reviewed.

### Strains and Sprains

The majority of injuries in the waste handling industry tend to be strains and sprains due to overexertion and/or poor body position. Employees commonly lift heavy, bulky loads. They are frequently working very quickly, without taking time to think about proper lifting techniques. Unless the load is particularly large, most employees work alone when lifting items. Body position is often twisted and unnatural while lifting, pushing or pulling trash on a sorting floor or hefting containers into the back of a garbage truck.

Ergonomics is recognized as being a serious problem not only in the waste services industry, but in the general American workforce as well. OSHA has tried to pass regulatory requirements for ergonomic programs, but has not yet found a workable solution. Though there is not a federal standard for ergonomic programs, some states have adopted regulations covering ergonomic concerns. OSHA's General Duty Clause states that employers must provide a safe and healthy workplace. This clause may be used by OSHA inspectors to write up violations of ergonomic origin.

Because the issue is so prevalent, there are many sources of information on the topic. Existing websites and training classes that are specifically targeted to address ergonomics in the waste industry are available. Automated waste collection vehicles have reduced the numbers of ergonomics related injuries significantly, though they do not completely eliminate the problem.

Walking surfaces are a major contributor to accidents resulting in strains and sprains. The OSHA regulation on Guarding Floor and Wall Openings and Holes is a frequently cited violation. Employees may trip over debris, fall into an open pit or slip on wet surfaces. Garbage collectors often experience sprains from jumping off the truck, and stepping up and down curbs.

## Fractures

Fractures make up approximately ten percent of non-fatal injuries occurring in the waste services industry. Employees are frequently struck by vehicles, or caught in machinery. They may also be struck by large pieces of debris, or fall on uneven surfaces. Falls often result in fractures. The noisy, distracting environment typical at transfer stations, recycling facilities, landfill operating disposal areas and other such sites contribute to these types of accidents. Cuts, bruises and similar type injuries result from the same conditions as fractures.

## ACCIDENT PREVENTION

### Job Hazard Analysis

The first step in prevention of on-the-job accidents is to define the actual hazards inherent in each work situation. Because the hazards vary from type of solid waste facility, from site to site, and with each individual task, it is necessary to perform site-specific job hazard analyses. Let us examine a transfer station as an example. Typical job-related tasks might include powered industrial truck (loaders, etc.) operation, spotting/load checking, maintenance, office clerical work, transfer truck drivers, and floor sorter. Each of these separate tasks would be analyzed for hazards specific to that job. The floor sorter for example, is subject to hazards such as being struck by equipment and/or vehicles on the floor, being struck by debris, being exposed to biological and/or chemical components of garbage, being exposed to excessive noise, working on slippery surfaces, experiencing sprains and strains from lifting, and potentially being cut by sharp materials. Once hazards such as these are identified for a specific task, control measures are identified for each potential hazard to which the worker might be exposed. These control measures fall into three major categories: 1) Engineering Controls, such as back up alarms on heavy equipment, 2) Administrative Controls, such as rules stating that employees on the floor must work in pairs, and 3) Personal Protective Equipment, such as reflective clothing. Each of these types of controls to prevent workplace accidents will be discussed in greater detail in the following section.

A job hazard analysis may identify a variety of solutions for hazard control. Performing job hazard analyses is a dynamic process, and will require re-evaluation as new equipment is brought in, procedures change, or better control technologies become available. It is a good practice to conduct routine, periodic review of all safety systems, including basic job hazard analyses. A guidance document is available on the OSHA.gov

website, OSHA publication 3071, titled Job Hazard Analysis.

### Hazard Controls

Implementation of hazard controls is the next step in accident prevention. As noted above, prevention of job-related accidents requires a thorough analysis of the types of hazards inherent in each type of job in a facility, followed by a plan to prevent those potential accidents. Accident prevention can be approached from three major fronts. Engineering Controls can be built into facilities or machinery to minimize or eliminate hazards inherent in equipment or sites. Administrative controls include the types of training and procedures established by management to insure worker safety. Finally, Personal Protective Equipment can be employed to minimize a worker's exposure to hazardous chemicals and situations.

### Engineering Controls

Engineering controls provide the most effective method of hazard control. Engineering may be used in some cases to significantly reduce or even completely remove the hazard. Dust control systems are an excellent example of engineering controls. Enclosed green waste handling facilities or transfer stations will typically have ventilation systems designed with filtration and high air turnover to handle the high dust load. Water spray dust suppression systems may also be used.

Other examples of engineering controls include:

- Automated garbage collection trucks. By using automated equipment, personnel exposure to traffic and ergonomic injuries is greatly reduced.
- Grooved floor surfaces designed to allow drainage.
- Back up alarms on vehicles.
- Machine guards, such as cover plates on conveyor gears.
- Interlock devices, such as a "dead man" switch on balers that require the operator to be present at the controls any time the machine performs a compression cycle.

Engineering controls are not fail-safe, however. It is common practice to override engineering controls when they are perceived as interfering with the function of the equipment or inconvenience the user. Wires are commonly cut or disconnected on back-up alarms because employees find them annoying, or the public complains of the noise along early morning garbage collection routes. Disabling back-up alarms leads directly to a common cause of fatal accidents: the assistant is struck and or run over by a garbage truck backing up with no alarm. There are also many examples of fatal accidents such as this in recycling facilities, landfills and transfer stations where back up

alarms were either intentionally disconnected or not maintained on loaders.<sup>2</sup>

Employees frequently disable or intentionally override engineering controls on other types of equipment as well. Maintenance workers will remove machine guards when performing periodic maintenance or repair on conveyor belts. If these guards are not replaced, the potential exists for employees to become entangled in the drive mechanism. There have been reports of amputations and fatalities resulting from improper machine guarding.<sup>3</sup> Maintenance employees especially need to be trained in machine guarding and lock out tag out procedures to ensure proper use and maintenance of manufacturer installed engineering controls.

### **Administrative Controls**

Administrative Controls are the second most effective method of controlling employee exposure to hazards. Administrative controls are typically “rules” and include items such as written safety programs, written procedures, labeling, and training.

Equipment and vehicles used in waste services typically have a large number of labels, warning users of potential hazards in the equipment. Most manufacturers will provide a replacement set of labels if the original labels become damaged or illegible. Review of these labels is an important part of a pre- and post shift vehicle or equipment inspection checklist. Use of checklists such as these is another example of an administrative control.

Safety programs and committees, as well as inspections are other forms of administrative controls. As a rule, if administrative control activities do not have committed management support, and active employee participation, they will not be effective. Both management and employees must buy into the need for a safe workplace in order for administrative controls, or any other type of safety procedures to be effective.

There are many safety programs that are required by OSHA. Specific requirements will vary from state to state. Examples of these types of programs include Hazard Communication (29 CFR 1910.1200), Permit Required Confined Space (29 CFR 1910.146 ) and Lock Out Tag Out (29CFR 1910.147). OSHA will look for the existence and implementation of these written

2. National Institute of Occupational Safety and Health, Fatality Assessment and Control Evaluation  
<http://www.cdc.gov/niosh/face/faceweb.html>  
Kentucky FACE 98KY044

3. California FACE Report #01CA005 and Texas FACE Investigation # 98TX112

programs if they come to a site to investigate an accident. Many of these programs are on the list of most frequently cited violations.

OSHA provides consulting services to help businesses identify what regulations apply to them. This service is separate from the compliance arm of OSHA, and does not lead to compliance inspections. Information on this service can be found on the OSHA website at [OSHA.gov](http://OSHA.gov).

### **Training**

Training is a critical component of employee safety and one of the primary administrative controls. The definition of effective training is training which causes a change in behavior. If you haven’t changed behavior, you haven’t trained. Training must be presented by a knowledgeable person who believes in the value of the material being presented. The trainer must be capable of communicating and actively engaging class participants. Evidence of effective training is employees who conduct constructive discussions of safety issues outside of the classroom. Training courses available from SWANA are an excellent starting point for training, but these courses must be supplemented with site specific information. Equipment, operating conditions and procedures vary from site to site. Employees must be aware of the hazards inherent in their own work, and policies and procedures to be followed for their work site.

### **Personal Protective Equipment**

The use of personal protective equipment (PPE) is the third method of controlling employee exposure to hazards. This should be used as a last resort, only after attempting to remove the hazard by engineering or administrative means.

Personal protective equipment is used extensively in the waste services industry. Employees may require safety glasses, gloves, safety shoes, hearing protection, leg guards, arm guards, hard hats or other protection depending on the hazards of their job. Selection of PPE should be based on an up to date job hazard analysis of each task.

Selection of PPE must also include evaluating the correct type of protection. Eye protection is available for a wide range of uses, including impact resistance, chemical resistance, welding, etc. For most jobs in waste services, employees should wear safety glasses with side shields that meet the requirements of the American National Standards Institute (ANSI) standard Z87.1. Workers in glass recycling, however, will require better protection. Impact resistant goggles would be a more appropriate choice. Gloves are another example of PPE that must be carefully chosen for the task.

Because of the prevalence of back injuries, many employers require the use of back belts. The National Institute of Occupational Health and Safety (NIOSH) does not recommend the use of back belts to prevent injury amongst employees who have not been injured.<sup>4</sup> There is not enough scientific evidence to support that back belts either prevent or contribute to the high incidence of back injuries. Arguments against the use of back belts state that users may feel that they are protected from injury, and attempt to lift more than they are capable of handling. According to the NIOSH publication “The most effective way to prevent back injury is to redesign the work environment and work tasks to reduce the hazards of lifting. Training in identifying lifting hazards and using safe lifting techniques and methods should improve program effectiveness.”

OSHA recently cited an East Coast transfer station and recycling company for failing to ensure employees were using adequate eye protection. The proposed fine for this violation was \$36,000.<sup>5</sup> Note that the violation was “failing to ensure employees were using” eye protection. This is an important distinction. The company may have provided safety glasses, provided training in proper use, and had written procedures requiring employees to wear them, but they failed to enforce rules regarding use of personal protective equipment. While it is true that the employee will have the ultimate responsibility for his or her own safety, the employer still has a legal obligation to enforce regulatory requirements. It is impossible to ensure that all employees will always follow the rules. If however, a company has a good written program and procedures in place, has documented training with regular refresher training, has provided adequate PPE based on a thorough job hazard analysis and has documented disciplinary action in cases of non-compliance, it is probable that OSHA would not find fault with the employer’s program and its implementation.

### **Integrated Hazards Control Program**

The most effective prevention makes use of all three types of controls, with engineering controls taking the highest priority. For example, a sorter working on a recycling belt line will be protected from ergonomic injuries by engineering and administrative controls used in conjunction with personal protective equipment. A well engineered work space will include bin placement where twisting is not required, and a good floor surface designed for standing in place for extended periods.

Administrative controls would include employee training that instructs the employee not to twist, stretch or reach, and policies for rotating work assignments. Personal protective equipment may include appropriate shoes with arch support if needed, and comfortable soles. Additional engineering and administrative controls and PPE such as gloves and hearing protection, will be in place for this employee’s protection from other job hazards such as cuts and falls.

The best prevention for workplace accident prevention is a systematic approach that includes job hazard analysis, training, maintenance, management support and active employee participation. An ideal workplace would be one where employees are fully aware of the hazards inherent in their jobs and the steps necessary to prevent accidents. On-going, open communication between workers and management will help insure that potentially hazardous situations are dealt with before injuries occur.

4. NIOSH publication; *Back belts. Do They Prevent Injury?*  
<http://www.cdc.gov/niosh/backbelt.html>

5. Region 2 News Release January 25, 2001

**Table 1. Number of nonfatal occupational injuries and illnesses involving days away from work<sup>1</sup> by selected worker and case characteristics and industry, All United States, private industry, 1996-2001**

Characteristic	Private industry 2,3,4,5	Trucking and courier services, except air (code 421)					
	2001	1996	1997	1998	1999	2000	2001
Total:	1,537,567	77,010	68,944	61,440	60,331	63,764	67,086
Occupation:							
Managerial and professional	97,797	241	--	202	420	211	219
Technical, sales, and administrative support	237,717	1,040	988	1,069	1,430	1,689	948
Service	266,346	1,395	230	226	446	298	364
Farming, forestry, and fishing	44,336	1,110	--	--	93	284	153
Precision production, craft, and repair	281,027	3,799	2,634	3,923	3,520	2,778	3,967
Operators, fabricators, and laborers	605,769	69,019	64,742	55,949	54,376	58,383	61,266
Number of days away from work:							
Cases involving 1 day	237,547	8,213	8,591	7,324	6,710	7,836	7,057
Cases involving 2 days	195,958	7,276	7,225	6,308	7,064	6,802	6,599
Cases involving 3-5 days	305,140	14,839	11,985	11,146	11,236	11,219	12,874
Cases involving 6-10 days	193,066	10,875	11,042	7,876	7,842	8,123	8,098
Cases involving 11-20 days	170,772	11,959	8,402	7,906	7,117	7,139	7,604
Cases involving 21-30 days	97,526	4,233	5,486	3,883	4,879	4,832	5,105
Cases involving 31 or more days	337,558	19,614	16,213	16,997	15,483	17,814	19,749
Median days away from work	6	9	9	9	8	9	10
Nature of injury, illness:							
Sprains, strains	669,889	36,886	33,409	30,054	28,731	31,685	31,588
Fractures	108,127	5,471	4,840	5,260	5,155	5,026	6,434
Cuts, lacerations, punctures	133,314	3,059	3,449	4,121	3,227	3,778	3,998
Bruises, contusions	136,361	7,502	7,502	6,536	6,572	6,327	6,699
Heat burns	25,078	417	--	--	206	322	448
Chemical burns	9,451	419	--	115	250	245	342
Amputations	8,612	--	177	217	242	130	143
Carpal tunnel syndrome	26,794	--	247	226	596	333	428
Tendonitis	14,124	364	--	260	159	479	426
Multiple injuries	53,211	2,961	4,616	2,905	2,869	2,548	3,163
With fractures	10,199	411	522	378	717	501	320
With sprains	21,959	1,370	1,165	1,137	802	1,196	1,032
Soreness, Pain	109,986	5,335	4,567	2,922	3,419	3,835	5,414
Back pain	42,679	2,347	1,964	924	1,272	1,629	1,900
All other	242,621	14,403	9,782	8,741	8,905	9,056	8,003
Part of body affected:							
Head	99,523	4,559	2,581	3,695	3,634	3,804	4,028
Eye	44,811	2,661	976	1,494	1,373	1,361	1,609
Neck	27,111	2,179	1,334	1,657	1,676	1,950	1,244
Trunk	561,603	34,267	29,374	25,308	24,070	25,614	25,449
Back	372,683	20,552	18,715	16,176	14,093	16,701	16,098
Shoulder	88,484	6,182	4,710	3,911	4,885	4,310	4,667
Upper extremities	355,344	10,628	9,030	9,943	9,937	10,726	11,787
Finger	123,523	2,825	2,373	2,319	3,230	2,927	3,162
Hand, except finger	63,727	1,477	1,493	2,065	1,772	1,750	1,932
Wrist	78,857	1,961	2,008	1,549	1,839	2,698	2,969
Lower extremities	322,959	16,057	16,593	13,593	13,622	13,688	17,004
Knee	119,670	5,348	4,872	4,231	4,607	4,861	5,857
Foot, toe	68,117	3,951	3,667	3,000	3,032	2,717	2,469

Body systems	21,657	552	718	343	879	434	603
Multiple	139,675	8,467	8,788	6,449	6,303	7,048	6,471
All other	9,695	300	526	453	211	500	500
See footnotes at end of table.							
Source of injury, illness:							
Chemicals, chemical products	25,125	950	559	334	929	490	516
Containers	209,078	10,391	13,012	9,737	9,301	11,476	13,199
Furniture, fixtures	53,974	1,741	1,885	2,246	1,535	2,438	2,127
Machinery	97,634	2,764	897	1,844	1,647	1,354	1,474
Parts and materials	162,475	9,653	6,519	7,186	6,823	8,781	6,019
Worker motion or position	245,867	9,886	7,112	7,497	8,012	6,615	9,137
Floor, ground surfaces	264,677	17,440	13,363	10,795	10,371	10,835	13,262
Handtools	68,113	1,390	898	896	799	1,065	908
Vehicles	128,534	15,380	19,100	14,937	14,377	14,774	14,738
Health care patient	67,635	--	--	195	--	118	--
All other	214,455	7,416	5,594	5,775	6,539	5,818	5,709
Event or exposure:							
Contact with object, equipment	400,033	15,419	12,718	15,111	14,483	15,706	15,139
Struck by object	199,855	7,411	6,715	7,328	7,917	9,512	7,415
Struck against object	101,177	4,089	3,318	4,851	3,386	3,380	4,662
Caught in object, equipment, material	68,048	1,815	1,581	1,806	2,059	1,704	2,031
Fall to lower level	96,359	9,288	6,291	6,810	5,388	4,593	7,759
Fall on same level	182,641	8,841	7,330	5,190	5,395	6,787	6,240
Slips, trips	50,269	2,497	1,878	1,523	2,495	1,870	2,585
Overexertion	409,011	20,388	19,112	15,596	14,546	18,528	18,604
Overexertion in lifting	227,291	9,421	9,947	7,887	7,099	10,026	9,246
Repetitive motion	65,162	761	676	638	997	686	1,231
Exposed to harmful substance	68,269	1,605	1,033	645	1,671	1,385	1,242
Transportation accidents	66,803	7,526	11,070	7,677	7,528	7,774	7,020
Fires, explosions	3,711	288	--	100	100	--	285
Assault, violent act	23,694	639	245	233	171	150	268
by person	17,215	--	241	182	91	96	243
by other	6,480	592	--	--	80	--	--
All other	171,615	9,757	8,591	7,916	7,557	6,260	6,716

<sup>1</sup> Days away from work include those which result in days away from work with or without restricted work activity.

<sup>2</sup> Excludes farms with fewer than 11 employees.

<sup>3</sup> Data conforming to OSHA definitions for mining operators in coal, metal, and nonmetal mining are provided to BLS by the Mine Safety and Health Administration, U.S. Department of Labor. Independent mining contractors are excluded from the coal, metal, and nonmetal mining industries. Data for Mining (Division B in the Standard Industrial Classification Manual, 1987 edition) include establishments not governed by the Mine Safety and Health Administration (MSHA) rules and reporting, such as those in Oil and Gas Extraction.

<sup>4</sup> Data conforming to OSHA definitions for employers in railroad transportation are provided to BLS by the Federal Railroad Administration, U.S. Department of Transportation.

<sup>5</sup> In 1996, air courier operations previously classified in Industry Groups 421, 422, 423, 452, 473, and 478 were reclassified to Industry Group 451. As a result, the 1996 and later estimates for these SIC's and Major Industry Groups 42, 45, and 47 are not comparable to those for prior years. In addition, the 1996 and 1997 estimates for transportation and public utilities may have more variability than those for prior years.

NOTE: Because of rounding and data exclusion of nonclassifiable responses, data may not sum to the totals. Dashes indicate data that do not meet publication guidelines. The scientifically selected probability sample used in each year was one of many possible samples, each of which could have produced different estimates. A measure of sampling variability for each estimate is available upon request.

SOURCE: Bureau of Labor Statistics, U.S. Department of Labor, August 12, 2003



**Table 2. Number of nonfatal occupational injuries and illnesses involving days away from work<sup>1</sup> by selected worker and case characteristics and industry, All United States, private industry, 1996-2001**

Characteristic	Private industry 2,3,4,5	Sanitary services (code 495)					
		1996	1997	1998	1999	2000	2001
Total:	1,537,567	7,279	6,805	5,880	5,989	6,615	5,557
Occupation:							
Managerial and professional	97,797	97	228	73	55	72	50
Technical, sales, and administrative support	237,717	172	293	147	70	188	211
Service	266,346	34	66	67	54	31	112
Farming, forestry, and fishing	44,336	95	--	33	--	--	--
Precision production, craft, and repair	281,027	815	652	671	880	488	548
Operators, fabricators, and laborers	605,769	6,020	5,550	4,876	4,875	5,811	4,585
Number of days away from work:							
Cases involving 1 day	237,547	1,403	1,088	778	866	909	1,058
Cases involving 2 days	195,958	860	1,040	796	588	950	616
Cases involving 3-5 days	305,140	1,758	1,455	1,007	1,273	1,280	968
Cases involving 6-10 days	193,066	879	855	899	794	1,038	693
Cases involving 11-20 days	170,772	808	965	633	546	768	667
Cases involving 21-30 days	97,526	384	393	388	694	372	249
Cases involving 31 or more days	337,558	1,188	1,009	1,379	1,228	1,298	1,305
Median days away from work	6	5	5	8	7	6	6
Nature of injury, illness:							
Sprains, strains	669,889	3,443	3,488	2,845	2,975	3,208	2,504
Fractures	108,127	468	475	315	475	499	576
Cuts, lacerations, punctures	133,314	404	462	604	402	450	386
Bruises, contusions	136,361	639	667	487	494	831	497
Heat burns	25,078	40	--	46	81	30	114
Chemical burns	9,451	47	45	80	31	64	50
Amputations	8,612	--	56	35	17	--	--
Carpal tunnel syndrome	26,794	37	50	47	--	43	17
Tendonitis	14,124	--	47	20	--	--	16
Multiple injuries	53,211	245	180	105	273	304	201
With fractures	10,199	52	--	--	--	70	38
With sprains	21,959	84	109	40	128	79	72
Soreness, Pain	109,986	355	350	302	294	223	432
Back pain	42,679	184	107	143	119	58	167
All other	242,621	1,558	951	996	916	916	742
Part of body affected:							
Head	99,523	624	354	449	394	599	390
Eye	44,811	330	216	223	175	288	162
Neck	27,111	102	158	107	43	177	118
Trunk	561,603	2,926	2,530	2,424	2,557	2,337	1,927
Back	372,683	1,900	1,615	1,363	1,641	1,455	1,151
Shoulder	88,484	423	457	473	424	405	354
Upper extremities	355,344	1,094	1,215	1,089	925	1,145	1,062
Finger	123,523	351	438	500	308	311	390
Hand, except finger	63,727	352	209	204	162	196	210
Wrist	78,857	138	226	194	184	228	174
Lower extremities	322,959	1,711	1,945	1,238	1,340	1,589	1,425
Knee	119,670	494	697	440	355	566	324
Foot, toe	68,117	360	283	202	316	327	258

Body systems	21,657	142	95	114	63	68	59
Multiple	139,675	537	471	452	555	636	572
All other	9,695	145	--	--	112	64	--
See footnotes at end of table.							
Source of injury, illness:							
Chemicals, chemical products	25,125	82	109	143	78	89	134
Containers	209,078	1,712	1,541	1,588	1,385	1,516	1,278
Furniture, fixtures	53,974	63	--	--	95	88	47
Machinery	97,634	232	185	133	145	187	192
Parts and materials	162,475	1,064	738	399	674	503	359
Worker motion or position	245,867	988	1,078	870	1,066	911	1,033
Floor, ground surfaces	264,677	987	1,285	851	822	999	590
Handtools	68,113	176	282	208	103	98	85
Vehicles	128,534	1,112	775	902	951	1,291	1,124
Health care patient	67,635	--	--	--	--	--	--
All other	214,455	864	781	765	669	934	714
Event or exposure:							
Contact with object, equipment	400,033	1,987	1,747	1,533	1,330	1,822	1,343
Struck by object	199,855	828	775	594	693	886	691
Struck against object	101,177	527	497	314	297	417	342
Caught in object, equipment, material	68,048	422	306	423	233	276	221
Fall to lower level	96,359	388	617	413	254	476	477
Fall on same level	182,641	587	609	411	582	581	404
Slips, trips	50,269	283	294	146	289	244	174
Overexertion	409,011	2,078	1,818	1,684	1,761	1,644	1,278
Overexertion in lifting	227,291	1,323	1,134	980	1,182	981	836
Repetitive motion	65,162	71	137	116	68	95	136
Exposed to harmful substance	68,269	307	207	305	182	210	319
Transportation accidents	66,803	549	407	461	506	670	522
Fires, explosions	3,711	19	--	--	--	--	--
Assault, violent act	23,694	56	--	31	32	40	28
by person	17,215	20	--	--	--	40	12
by other	6,480	37	--	--	28	--	16
All other	171,615	953	947	776	981	828	875

<sup>1</sup> Days away from work include those which result in days away from work with or without restricted work activity.

<sup>2</sup> Excludes farms with fewer than 11 employees.

<sup>3</sup> Data conforming to OSHA definitions for mining operators in coal, metal, and nonmetal mining are provided to BLS by the Mine Safety and Health Administration, U.S. Department of Labor. Independent mining contractors are excluded from the coal, metal, and nonmetal mining industries. Data for Mining (Division B in the Standard Industrial Classification Manual, 1987 edition) include establishments not governed by the Mine Safety and Health Administration (MSHA) rules and reporting, such as those in Oil and Gas Extraction.

<sup>4</sup> Data conforming to OSHA definitions for employers in railroad transportation are provided to BLS by the Federal Railroad Administration, U.S. Department of Transportation.

<sup>5</sup> In 1996, air courier operations previously classified in Industry Groups 421, 422, 423, 452, 473, and 478 were reclassified to Industry Group 451. As a result, the 1996 and later estimates for these SIC's and Major Industry Groups 42, 45, and 47 are not comparable to those for prior years. In addition, the 1996 and 1997 estimates for transportation and public utilities may have more variability than those for prior years.

NOTE: Because of rounding and data exclusion of nonclassifiable responses, data may not sum to the totals. Dashes indicate data that do not meet publication guidelines. The scientifically selected probability sample used in each year was one of many possible samples, each of which could have produced different estimates. A measure of sampling variability for each estimate is available upon request.

SOURCE: Bureau of Labor Statistics, U.S. Department of Labor, August 12, 2003

**Table 3. Number of nonfatal occupational injuries and illnesses involving days away from work<sup>1</sup> by selected worker and case characteristics and industry, All United States, private industry, 1996-2001**

Characteristic	Private industry 2,3,4,5	Miscellaneous durable goods (code 509)					
	2001	1996	1997	1998	1999	2000	2001
Total:	1,537,567	11,058	6,821	6,959	6,292	5,300	4,230
Occupation:							
Managerial and professional	97,797	180	227	140	--	199	214
Technical, sales, and administrative support	237,717	708	703	641	856	977	607
Service	266,346	--	95	73	--	--	--
Farming, forestry, and fishing	44,336	--	--	--	306	--	--
Precision production, craft, and repair	281,027	1,502	596	739	725	379	207
Operators, fabricators, and laborers	605,769	8,521	5,154	5,318	4,216	3,712	3,172
Number of days away from work:							
Cases involving 1 day	237,547	1,638	1,053	1,307	1,105	594	674
Cases involving 2 days	195,958	829	781	1,084	766	829	721
Cases involving 3-5 days	305,140	1,876	1,259	1,674	1,197	1,046	545
Cases involving 6-10 days	193,066	1,502	888	675	518	604	462
Cases involving 11-20 days	170,772	1,015	1,031	863	573	801	374
Cases involving 21-30 days	97,526	1,185	518	316	789	217	465
Cases involving 31 or more days	337,558	3,012	1,291	1,041	1,345	1,210	989
Median days away from work	6	9	6	4	6	7	7
Nature of injury, illness:							
Sprains, strains	669,889	3,664	2,721	2,614	2,585	2,046	1,534
Fractures	108,127	1,590	720	203	563	340	252
Cuts, lacerations, punctures	133,314	522	563	817	889	455	444
Bruises, contusions	136,361	792	480	863	392	558	291
Heat burns	25,078	323	204	176	--	307	109
Chemical burns	9,451	--	--	108	--	--	--
Amputations	8,612	--	138	--	86	--	--
Carpal tunnel syndrome	26,794	--	86	157	185	--	--
Tendonitis	14,124	167	93	--	--	--	--
Multiple injuries	53,211	939	214	206	393	253	203
With fractures	10,199	394	81	--	--	72	135
With sprains	21,959	--	67	74	--	74	--
Soreness, Pain	109,986	558	401	292	228	445	370
Back pain	42,679	198	188	164	--	93	--
All other	242,621	2,374	1,187	1,471	867	801	896
Part of body affected:							
Head	99,523	868	607	695	552	335	352
Eye	44,811	483	245	383	307	176	134
Neck	27,111	197	77	--	87	184	--
Trunk	561,603	3,679	2,819	2,795	2,454	1,714	1,724
Back	372,683	2,129	1,650	1,970	1,603	1,137	1,020
Shoulder	88,484	1,151	587	268	84	226	245
Upper extremities	355,344	2,175	1,238	1,485	1,416	971	1,045
Finger	123,523	860	471	537	523	390	287
Hand, except finger	63,727	344	269	418	364	283	283
Wrist	78,857	253	214	368	298	131	150
Lower extremities	322,959	2,763	1,611	1,259	1,284	1,183	767
Knee	119,670	427	295	376	472	163	200
Foot, toe	68,117	1,052	519	443	165	373	105
Body systems	21,657	112	--	--	--	--	68
Multiple	139,675	1,182	363	596	371	881	227

All other	9,695	--	76	--	90	--	--
See footnotes at end of table.							
Source of injury, illness:							
Chemicals, chemical products	25,125	--	--	146	--	--	169
Containers	209,078	1,516	1,286	1,282	954	1,109	1,202
Furniture, fixtures	53,974	121	--	508	--	241	--
Machinery	97,634	336	456	665	396	233	429
Parts and materials	162,475	2,297	1,223	1,098	1,010	511	454
Worker motion or position	245,867	1,410	905	899	1,048	692	595
Floor, ground surfaces	264,677	1,152	861	567	816	900	359
Handtools	68,113	450	306	337	270	171	71
Vehicles	128,534	1,041	634	586	742	735	409
Health care patient	67,635	--	--	--	--	--	--
All other	214,455	2,645	1,055	873	947	662	492
Event or exposure:							
Contact with object, equipment	400,033	5,079	1,854	2,224	2,305	1,529	1,500
Struck by object	199,855	3,649	953	1,290	1,157	775	731
Struck against object	101,177	929	384	595	410	382	368
Caught in object, equipment, material	68,048	263	319	255	493	303	177
Fall to lower level	96,359	692	283	289	429	280	171
Fall on same level	182,641	370	536	571	546	692	268
Slips, trips	50,269	443	265	176	163	141	137
Overexertion	409,011	2,320	2,063	1,984	1,266	1,083	1,050
Overexertion in lifting	227,291	1,503	1,431	1,430	581	652	709
Repetitive motion	65,162	175	302	235	316	--	125
Exposed to harmful substance	68,269	459	199	395	189	335	211
Transportation accidents	66,803	278	357	353	281	488	352
Fires, explosions	3,711	--	79	100	--	--	--
Assault, violent act	23,694	--	--	--	--	--	--
by person	17,215	--	--	--	--	--	--
by other	6,480	--	--	--	--	--	--
All other	171,615	1,178	849	618	685	594	397

<sup>1</sup> Days away from work include those which result in days away from work with or without restricted work activity.

<sup>2</sup> Excludes farms with fewer than 11 employees.

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<sup>4</sup> Data conforming to OSHA definitions for employers in railroad transportation are provided to BLS by the Federal Railroad Administration, U.S. Department of Transportation.

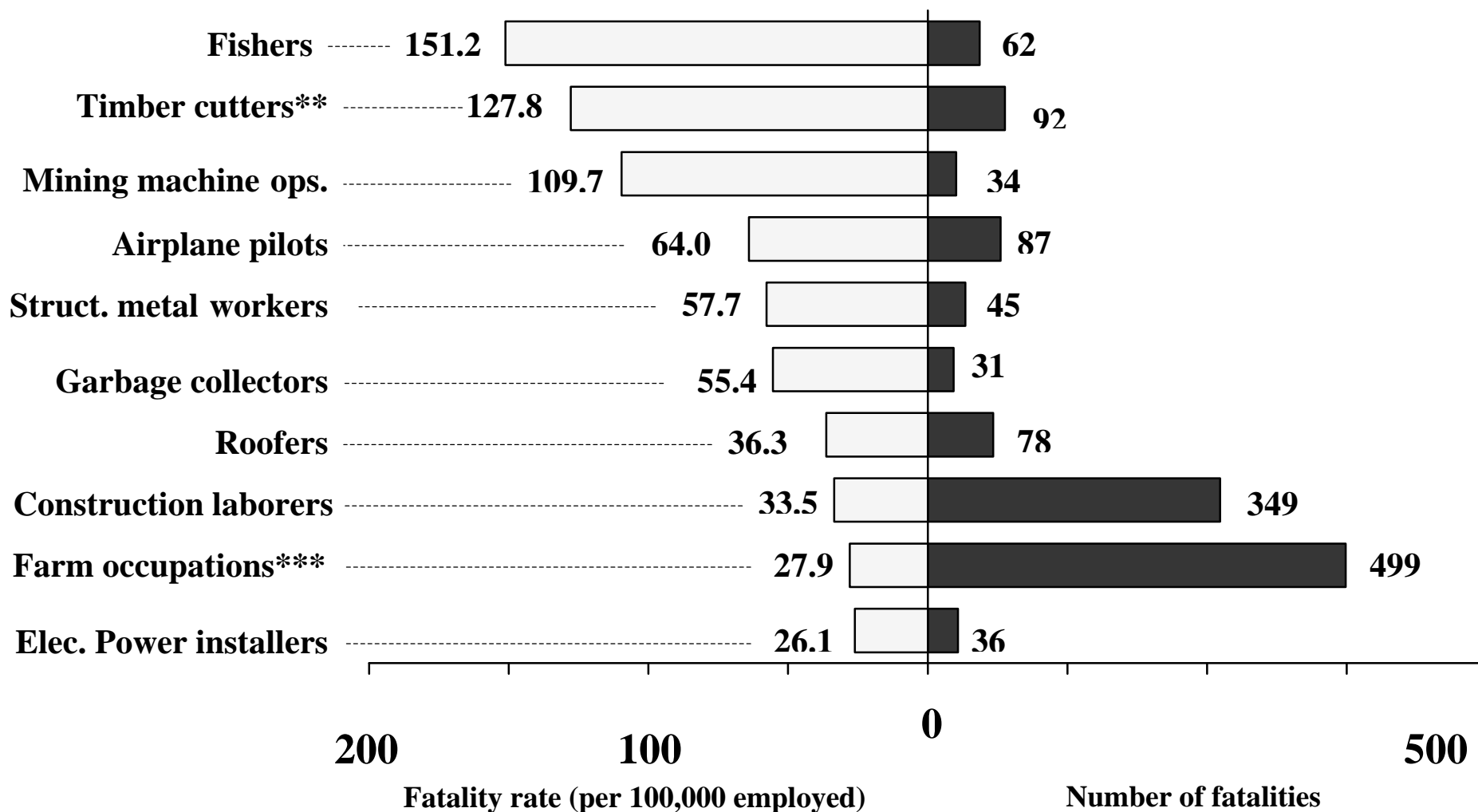
<sup>5</sup> In 1996, air courier operations previously classified in Industry Groups 421, 422, 423, 452, 473, and 478 were reclassified to Industry Group 451. As a result, the 1996 and later estimates for these SIC's and Major Industry Groups 42, 45, and 47 are not comparable to those for prior years. In addition, the 1996 and 1997 estimates for transportation and public utilities may have more variability than those for prior years.

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SOURCE: Bureau of Labor Statistics, U.S. Department of Labor, August 11, 2003

# Figure 1: Occupations\* with the highest fatality rates, 2001

Average fatality rate for all occupations: 4.3



\*Selected occupations had a minimum of 30 fatalities in 2001.

\*\*Timber cutters include the following: Timber cutting and logging occupations; Supervisors, forestry, and logging workers.

\*\*\*Farm occupations include the following: Non-horticultural farmers, Non-horticultural farm managers, Farm workers, and Farm worker supervisors.

Rate = (Fatal work injuries/Employment) x 100,000 workers. Employment data extracted from the 2001 Current Population Survey (CPS). The fatality rates were calculated using employment as the denominator; employment-based rates measure the risk for those employed during a given period of time, regardless of exposure hours.

NOTE: Data exclude fatalities resulting from September 11 terrorist attacks.

SOURCE: US Department of Labor, Bureau of Labor Statistics, Census of Fatal Occupational Injuries, 2001.